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Gottlieb, Troels; Gøtzsche-Astrup, Oluf

Published in:
Journal of Nursing Management

DOI:
10.1111/jonm.12696

Publication date:
2019

Document Version
Peer reviewed version

Citation for published version (APA):
Gottlieb, T., & Gøtzsche-Astrup, O. (2019). The predictive validity of charge nurse personality on objective and subjective performance of subordniates. *Journal of Nursing Management*, *27*(2), 388-395. https://doi.org/10.1111/jonm.12696

The predictive validity of charge nurse personality on objective and subjective performance of subordinates.

Abstract

Aim: This study examines to what degree the Hogan Personality Inventory (HPI) predicts leadership effectiveness for charge nurses in Danish hospitals.

Background: Personality tests are implemented in health care management in an effort to improve evidence-based personnel selection and recruit more efficient leaders. However, relatively few studies of the predictive validity of personality have been conducted in hospital management.

Methods: 177 charge nurses from three Danish hospitals completed a five-factor model-based personality inventory. These were coupled with data from 3,497 subordinates. Cluster-robust regression analysis was used to investigate relationships between personality and short-term sickness absence and satisfaction and leadership ratings for 3,497 subordinates.

Results Low subordinate sickness absence was related to leader Extraversion and Conscientiousness. Employee satisfaction was related to leader Emotional Stability, Extraversion and Conscientiousness. Leadership ratings were associated with Emotional Stability.

Conclusions: Personality predicted both objective and subjective measures of performance, although the effects were stronger for objective than subjective measures.

Implications for nursing management: The results lend support to the use of validated personality measures in recruiting and promoting nurses in the health care sector. The use of personality tests should support rather than replace other talent management measures.

1 Introduction

Personality inventories have long been applied in the corporate world and is a cornerstone in personnel selection. A broad range of studies into personality and job performance have been conducted. However, few specifically address the issue of selecting high performing health care staff. One explanation for this may be that the sector has traditionally been commissioned to provide as much health as possible and be less concerned with efficiency and that hiring decisions have been made based mostly on finding the right medical/technical education and experience. Recently, medical science has become pressured by its own success to accumulate evidence-based treatments to foster ever-higher life quality. In this more complex reality with the obligation to be more efficient and client-oriented, the interest in personality inventories the health care sector. For instance, Teng, Hsu, Chien, and Chang (2007) have found that patients in a Malaysian context generally perceived open, emotional stable and agreeable nurses to represent a higher degree of nursing quality (reliability, responsiveness, assurance and empathy). Yeh et al. (2016), also in a Malaysian sample, have reported that Conscientiousness and Emotional Stability predict leadership performance for charge nurses.

The general consensus around personality inventories is that they are useful for predicting overall job performance and better at predicting more specific behaviors (Barrick, Murray & Mount, 2012; Hough & Furnham, 2003). Estimates of explanatory power in terms of performance outweigh the investment of time and money needed to implement personality testing in a range of sectors (Furnham, 2013). Furthermore, several meta-analyses have documented the utility of personality tests in a range of sectors and for a broad variety of job functions (Barrick & Mount, 2003; Tett & Christiansen, 2007; Ones, Dilchert, Viswesvaran, & Judge, 2007).

However, hospital management should retain a healthy skepticism until primary studies have documented the use of personality tests in the health care sector. The market abounds with personality tests of varying quality, some with low or no explanatory power (Morgeson, Campion, Hollenbeck, Murphy, & Schmitt,

2007; Morgeson, Campion, Dipboye, et al., 2007). This study investigated whether personality, as measured by the five-factor model the Hogan Personality Inventory (HPI), predicts performance among charge nurses at three major hospitals in the Capital Region of Denmark.

2 Framework and hypotheses

2.1 Personality and job performance

Many trait psychologists adhere to Goldberg's (1990) analysis, in which trait adjectives are represented in the five-factor model (FFM) of personality. Although the labels vary somewhat, the five dimensional factors are usually denoted extraversion/introversion, friendliness/hostility, conscientiousness, emotional stability/neuroticism and openness to new experiences (Digman, 1991). Traits can be understood as rooted in human biology (McCrae et al., 2000; Nettle, 2006) or interpersonal descriptions and negotiations of how to understand and predict behavior (eg. Hogan, 2005; Hogan & Chamorro-Premuzic, 2015). They have led to a model that provides a general understanding of human personality as those attributes of human behavior that are captured in language and that vary between individuals (Hartmann, 2006). Barrick and Mount (1991) revitalized the field of personality and job performance research when they meta-analyzed a large sample of American/Canadian primary studies. By ordering the findings according to the FFM, they showed consistent and substantially important effects. Similar findings have been reproduced in the European community, suggesting that the FFM shows validity generalization (Salgado, 1997), and incremental validity to general mental ability of about 10% for Conscientiousness and 11% for Emotional Stability (Salgado, 1997). Meta-analyses of meta-analyses suggest that the corrected overall validity coefficients are low (Conscientiousness .22, Emotional Stability .14, Agreeableness .13, Extraversion .10 and Openness to Experience .07) (Hurtz & Donovan 2000), or modest (Barrick, Mount, & Judge, 2001). When it comes to leadership effectiveness in particular, Judge, Bono, Ilies, and Gerhardt (2002) have estimated the FFM to explain 15% of the variability.

2.2 Socioanalytic theory

Hogan's (1982) socioanalytic theory aims at a more theoretical and hypothesis-based approach. Socioanalytic theory aims to account for differences between individuals in terms of status, popularity and performance (Hogan, 1982). In socioanalytic theory, personality is explained on the basis of three universal generalizations of 'master motives' in life. These are *getting along* (gaining acceptance), *getting ahead* (gaining status) and *finding meaning* (gaining structure and purpose). Behavior is partly motivated to avoid frustrations of these three master motives (Hogan, 1982; Hogan, Jones & Cheek, 1985; Hogan, 1996). On the one hand, the getting along motive drives behavior that improves cooperation and strengthens interpersonal behavior (Hogan & Holland, 2003). It is predicted by the positive emotionality part of emotional stability and the friendliness and conscientiousness traits. On the other hand, the getting ahead motive drives behavior that seeks to enhance the reputation of the individual; that is, behavior related to competition (Hogan & Holland, 2003). This behavior is predicted by the self-confidence elements of emotional stability, the ambition elements of extraversion and openness to experience. From this theoretical background, Hogan and Holland (2003) conducted a theoretically aligned analysis of getting along and getting ahead criteria. Viewed as two essential but separate requirements of job success, each dimension was linked to specific performance criteria. From their large study, they concluded that the FFM traits were moderately predictive of job performance, with corrected validities of .43 for Neuroticism, .36 for Conscientiousness, .35 for Extraversion, .34 for Agreeableness and .34 for Openness.

2.3 The Hogan Personality Inventory

Trait terms have adaptive value in the sense that they enable predicting other people's behavior and communicating this as personality (Hogan & Shelton, 1998; Hogan, 2005). Following this line of reasoning, completing self-report inventories on personality is likened to responding to an anonymous interviewer (Hogan, Hogan, & Roberts, 1996). From the expectation of socioanalytic theory as well as studies of work-related behavior, the HPI splits FFM Extraversion into Ambition and Sociability, and Openness into

Inquisitive and Learning Approach, leading to an inventory with seven primary scales. The first scale, Adjustment, concerns the degree to which a person appears calm and self-accepting. The second scale, Ambition, measures the degree to which a person appears socially self-confident and competitive. The third scale, Sociability, concerns the degree to which a person seems to need and enjoy interacting with others. The fourth scale, Interpersonal Sensitivity, measures the degree to which a person is seen as perceptive and socially sensitive. The fifth scale, Prudence, taps the degree to which a person seems conscientious and dependable. The sixth scale, Inquisitive, measures the degree to which a person is perceived as bright and creative, and the seventh scale, Learning Approach, taps the degree to which a person seems to enjoy academic activities (Hogan, Davies, & Hogan, 2007). Turning to the present case, nursing management in public hospitals, we can develop a range of hypotheses as to the relationship between managerial performance and personality.

3 Hypotheses

3.1 H1: Adjustment is positively related to managerial performance

Hogan and Holland (2003) have reported Adjustment to predict getting along (behavior at work). Emotional Stability has consistently been reported to predict leadership performance (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Hurtz & Donovan, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002).

3.2 H2: Ambition is positively related to managerial performance

Hogan and Holland (2003) have reported Ambition to predict getting along and getting ahead. Extraversion has consistently been reported to predict leadership performance (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Hurtz & Donovan, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002).

3.3 H3: Sociability is positively related to managerial performance

Hogan and Holland (2003) did not find Sociability to predict getting along nor getting ahead. That being said, Extraversion has consistently been reported to predict leadership performance in other studies (Barrick & Mount, 1991; Barrick, Mount, & Judge 2001; Hurtz & Donovan, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002)

3.4 H4: Interpersonal Sensitivity is positively related to employees' ratings of their manager

Hogan and Holland (2003) reported Interpersonal Sensitivity to predict getting along and getting ahead. Mixed results were found for Agreeableness' predictive validity of leadership (Hurtz & Donovan, 2001, Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002.)

3.5 H5: Prudence is positively related to managerial performance

Hogan and Holland (2003) reported Prudence to predict getting along and getting ahead (Hogan & Hogan, 2007). Conscientiousness has consistently been found to predict leadership performance (Barrick, Mount, & Judge, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002).

3.6 H6: Inquisitive is positively related to managerial performance

Hogan and Holland (2003) reported Inquisitive to predict getting ahead (Hogan & Hogan, 2007). Mixed results has been found for Openness' predictive validity of leadership performance. Some studies report zero findings (Hurtz & Donovan, 2001) and others small positive correlations (Barrick, Mount, & Judge, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002).

3.7 H7: Learning Approach is positively related to managerial performance

Hogan and Holland (2003) found Learning Approach to predict getting along with a .12 correlation and getting ahead with .15. Mixed results were found for Openness' predictive validity of leadership

performance (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Judge, Barrick, Ilies, & Gerhardt, 2002).

4 Method

4.1 Participants and procedure

Our sample consisted of 174 female and 3 male Danish charge nurses between 30 and 64 years (M=49, SD=7.4) with an average of 12.6 years of leadership experience (SD=7.4). Employees with the formal title of 'charge nurse' in three large public hospitals in Copenhagen were asked to complete the HPI. This led to a response rate of 79%. As an expression of thanks, participants received Hogan Assessment's Career Report, which includes HPI scores and a specific test feedback on leadership behavior.

4.2 Measures

4.2.1 Personality

Personality was assessed using the HPI. Internal reliability estimates are between .71 (Interpersonal Sensitivity) and .89 (Adjustment), and test-retest reliabilities range between .74 (Prudence) and .86 (Adjustment).

4.2.1 Managerial performance

To tap both subjective and objective measures of performance, we decided on two outcomes for our study, both of which are used as such at the hospitals. Managerial performance was measures using short-term sickness absence and leadership ratings. Since public hospitals in Denmark do not generate profit, there are no key performance indicators (KPIs) based around cost effectiveness of the charge nurses. However, short-term sickness absence is used as an objective indicator in the hospitals. Systematic differences in sickness absence that cannot be explained on the basis of other variables such as section and specialty, can be due to the quality of management. Furthermore, short-term sickness absence is costly for the hospitals as they

are required to continue paying the salary of the sick employee as well as the extra employee needed to cover for the sick one. Short-term sickness absence was defined as sickness absence below 28 consecutive days and coded as a percentage of fulltime employment.

Leadership ratings were assessed from an existing subjective Likert-scaled peer rating completed every 3rd year by each of the charge nurses' subordinates, which is considered another important KPI in the hospitals. In particular, we distinguished between *leadership quality* and *job satisfaction*. Four items measured leadership quality: *Is your work acknowledged and appreciated by your manager?; Is your manager good at organizing the work at your workplace?; Do you receive help and support from your manager when you need it?; Does your manager give high priority to well-being in the workplace?* Four items measured job satisfaction: *Are you satisfied with the working environment?; Are you satisfied with the way in which your skills are used?; Are you satisfied with your future job prospects?; Taking everything into account, are you satisfied with your job as a whole?* Internal reliability was .95 for the leadership quality ratings scale and .94 for the job satisfaction scale.

5 Results

5.1 Personality scores

We conducted a one-sample t-test to investigate whether the average scores for each scale differed statistically significantly from the norm. Charge nurses differed statistically significantly from the norm on all scales. They had higher scores on Adjustment (60.5), Ambition (65.4), Sociability (54.5), Interpersonal Sensitivity (62.5) and Learning Approach (60.2), and lower scores on Prudence (45.1) and Inquisitive (38.7).

5.2 Personality and performance: objective and subjective measures

The final dataset had a multilevel structure, with personality scores at the level of the charge nurse and the employees' ratings nested within each. As employees work together and share many factors of their daily

lives that may influence the outcomes of interest, it would be inappropriate to view these as independent observations. Because of this data structure, and to avoid inflating the risk of type-I error, we conducted OLS regressions with cluster-corrected standard errors at the level of the charge nurses. This model fixes our degrees of freedom to the level of the charge nurses, avoiding the boost in statistical power that would result in viewing each individual rating as independent of the others. In three models, the scores on the seven HPI personality scales were used as the predictor variables and sick absence, leadership quality and general satisfaction as the criterion variables, respectively. The results of these analyses are reported in Tables 1 through 3 below.

Table 1: Predicting short-term sickness absence from scores on the HPI.

Scale	Model I R^2=0.11	Model II (controlled) R^2=0.18
Adjustment	.003 (.005)	.001 (.005)
Ambition	.003 (.005)	.003 (.005)
Sociability	**-.013 (.004)****	**-.015 (.004)*****
Interpersonal Sensitivity	-.001 (.004)	<.001 (.004)
Prudence	**-.009 (.004)***	**-.009 (.004)***
Inquisitive	<.001 (.004)	<.001 (.004)
Learning Approach	-.002 (.004)	-.006 (.004)
Leadership experience		.012 (.014)
Number of Employees		**.008 (.004)***
Outpatient department (yes/no)		-.178 (.244)

Note: ***=p<.001, **=p<.01, *=p<.05. n=3,476 (176 clusters). Model I reports the results of a model including only the personality scales. Model II reports the results of a model that includes leadership experience, number of employees and whether the charge nurse is working at an outpatient department as control variables. Results are reported as coefficient (cluster-robust standard error).

Sociability and Prudence both negatively predicted short-term sickness absence. The number of years of leadership experience or being an outpatient department (opposed to a 24-hour department) did not predict short-term sickness absence, but there was a significant and positive relationship between the number of employees and short-term sickness absence. Personality accounted for 11% of the variance in short-term sickness absence.

Table 2: Predicting general satisfaction ratings from scores on the HPI.

Scale	Model I R^2=0.02	Model II (leadership experience) R^2=0.03
Adjustment	**.100 (.036)****	**.104 (.034)****
Ambition	-.053 (.034)	-.047 (.035)
Sociability	**.064 (.037)†**	**.086 (.036)**
Interpersonal Sensitivity	-.020 (.03)	-.051 (.033)
Prudence	**.071 (.035)***	**.082 (.036)***
Inquisitive	-.004 (.035)	-.011 (.038)
Learning Approach	.029 (.030)	.032 (.032)
Leadership experience		.084 (.100)
Number of Employees		**-.036 (.020) †**
Outpatient department (yes/no)		1.20 (1.74)

Note: ***=p<.001, **=p<.01, *=p<.05, †=p<.1. n=3,053 (126 clusters). Model I reports the results of a model including only the personality scales. Model II reports the results of a model that includes leadership experience, number of employees and whether the charge nurse is working at an outpatient department as control variables. Results are reported as coefficient (cluster-robust standard error).

Higher scores on Adjustment, Prudence and Sociability positively predicted general satisfaction ratings from employees. Charge nurses with higher scores on these scales had employees with higher satisfaction ratings. Again, leadership experience was unrelated to the dependent measure. There was a marginally significant and negative relationship between the number of employees and satisfaction. The personality model explained only around 2% of the variance in satisfaction.

Table 3: Predicting leadership ratings from scores on the HPI.

Scale	Model I R^2=0.04	Model II (leadership experience) R^2=0.05
Adjustment	**.082 (.040)***	**.101 (.039)****
Ambition	-.058 (.043)	-.030 (.045)
Sociability	-.029 (.043)	-.014 (.047)
Interpersonal Sensitivity	**.072 (.038) †**	.038 (.040)
Prudence	.047 (.046)	.077 (.049)
Inquisitive	-.026 (.042)	-.039 (.046)
Learning Approach	.051 (.043)	.062 (.047)
Leadership experience		-.070 (.149)
Number of employees		**-.074 (.027)****
Outpatient department (yes/no)		-.098 (2.40)

Note: ***=p<.001, **=p<.01, *=p<.05, †=p<.1. n=3,426 (146 clusters). Model I reports the results of a model including only the personality scales. Model II reports the results of a model that includes leadership experience, number of employees and whether the charge nurse is working at an outpatient department as control variables. Results are reported as coefficient (cluster-robust standard error).

Higher scores on the Adjustment and, to some degree, the Interpersonal Sensitivity scales predicted higher scores on the leadership ratings from employees. However, personality explained only a small amount (4%) of the total variance.

Notably, years of leadership experience did not predict either of the subjective measures. In none of the models did the inclusion of additional control variables (age, specialization, recent layoffs) change the correlations but lowered the statistical power of the models to make the correlations statistically insignificant.

5.3 Performance differences between participants and those that did not participate

There may be systematic differences between the 79% who agreed to fill out the personality measure and the 21% that did not. Therefore, we conducted a range of tests to investigate differences between the participants and those that did not participate. There were no statistically significant age differences (p=.656), nor any differences in years of experience (p=.714). Importantly, there were no statistically significant differences in the objective measure (p=.672). However, those who completed the personality measure were more likely to have employees with higher satisfaction ratings (p=.031) and leadership ratings (p=.058).

6 Discussion

This study investigated whether FFM personality traits predicts performance among charge nurses at three major hospitals in the Capital Region of Denmark. Even after controlling for other relevant factors, personality explained an additional amount of variance in short-term sickness absence, satisfaction and leadership ratings.

Our findings support Hypotheses 1, 3 and 5, while the rest did not find support in our sample. Being more emotionally stable, balanced under pressure, organized and planful is likely to make life easier for subordinates, especially in the hospital environment. A novel finding concerns the negative relationship between short-term sickness absence and Sociability. The subordinates of charge nurses whose personality scores indicated that they were less gregarious and socialized less had higher short-term sickness absence than others. Perhaps this finding can be explained in terms of the importance of getting along in this domain. Employees who feel that they have a personal relationship with their superiors may be better able to cope at the job with factors that would otherwise result in calling in sick. This is supported by the result that the number of employees is related to negative outcomes. Positions with more subordinates seem to increase short-term sickness absence and depress satisfaction and leadership ratings. Perhaps this is due to the larger distance between subordinate and superordinate, making meaningful interactions few and far between.

Some of the relationships that we failed to find warrant attention. Although the number of participants, and the subsequent statistical power of the analyses, were in the low end, previous literature indicated that we should expect a positive relationship between the personality scale of Ambition and getting ahead performance measures. No such relationship was found. One explanation of the null finding may be that neither sickness absence nor the leadership ratings used are getting ahead criteria. Whereas sickness absence could be argued to be a getting ahead criterion (being motivated to perform makes employees go to work to carry out their job even on a bad day), it might also be interpreted as a getting along criterion (feeling safe and supported at work makes employees go to work even on a bad day). The leader ratings in this study, on the other hand, consisted of obvious getting along items, suggesting that the sociability part of Extraversion should predict getting along performance – enjoying interaction with employees could nurture feelings of being appreciated and accepted by one's leader. Furthermore, the Danish welfare society and culture of low power distance and tenderness (Hofstede, 2011) may also explain this finding.

Perhaps these cultural elements are especially pervasive in nursing, in which overt displays of ambition and competitiveness might not be rewarded. That being said, the charge nurses in our sample had the largest deviation from the population norms on the Ambition scale (with an average percentile score of 65), indicating that Ambition may be related to leadership emergence in the nursing sector.

Our balance tests between those who chose to participate and those who did not indicated no or only small differences between the groups. In terms of generalizability, we believe that our findings will generalize to charge nurses at other public hospitals in the Danish health care sector. Even if objective performance measures on average show weaker associations between resources and performance compared to subjective ratings (Nielsen et al., 2017), the objective measures had by far the closest relationship to personality in this study. Perhaps this mirrors a 'bad is stronger than good' effect: Personality can 'get in the way', stressing people and causing short-term sickness absence.

7 Limitations

As the personality data was self-report observational data, we cannot be sure that the scores actually reflected behavior in the workplace. However, as the goal of the study was to evaluate the feasibility of using a personality measure as part of recruitment in the nursing sector, this is not problematic. Since the data was observational we cannot decide on the causal direction of the relationships. However, as personality is relatively stable in adulthood, most of the relationship is probably due to the effect of personality on performance. A third limitation concerns the sample size. As the HPI takes approximately 20 minutes to complete, it required a time investment from the participants. The sample of 177 charge nurses that made up the clusters restricted our statistical power to detect effects. In light of this, we urge caution in over-interpreting the null findings.

8 Implications

Do our findings support the use of personality inventories in nursing management in public hospitals? An important part of answering this question lies in the monetary benefits in using personality measures. We used our objective performance criterion of short-term sickness absence to estimate the possible savings in using a personality inventory. We found personality to explain 11% of the variation in sickness absence. The variance is 1.2 percent of total working hours, corresponding to .13 percent of total working hours. As the average charge nurse in our sample had 20 employees, and based on the average salary of a Danish nurse, reducing sickness absence for subordinates with an average of .13 percent of work amounts to a yearly saving of 1574 € (1858 $) per charge nurse. As this is the level on which the personality inventory would be implemented, the cost of conducting the personality test should be compared to this saving. Furthermore, this is only one of the measures on which we might expect a positive effect of utilizing personality inventories in recruitment decisions. This calculation carries some uncertainty and should not be over interpreted.

9 Conclusion

This study investigated whether personality predicted performance among charge nurses at three major hospitals in Denmark. Our findings provide moderate support for the implementation of personality inventories in the health care sector, although personality measures are no panacea for personnel selection. Positive performance outcomes among subordinates in three large public hospitals in Denmark were associated with higher scores on scales associated with emotional stability and stress resilience, gregariousness and social extraversion, and with organizing and planning among charge nurses. Some scales that have shown strong validities in previous studies, such as self-promotion and goal focus, did not predict performance outcomes, indicating that unique characteristics of nursing management need to be taken into account. The strongest relationship was observed for the objective measure of short-term sickness absence, indicating the possible economic feasibility of focusing on these scales as part of recruitment, and the relevance for nursing management in hospitals.

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